Evaluating the Effectiveness of Earned Value Management (EVM) Implementation Using Integrated Project Control Software Suites

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ABSTRACT

Earned Value Management or EVM is a project management process that takes into account the analysis of a wide range of factors (costs, schedule) in an effort to increase project success probabilities. It was summed up that the process of EVM helps in realizing the project progress and the overall result. Moreover, it develops them wonderfully. This research paper looks into the effects of Integrated Software use and its results in the process of EVM. It showed that applications of EVA tools greatly contribute to the increase of percentages related to the overall productivity and the percentage of overall earned value of projects.

Key Words: Earn Value Management (EVM), Earned Value Analysis (EVA), Project integration, Integrated Software Suits, Project Management.

INTRODUCTION

The project management process of EVM or Earned Value Management denotes the process which is used in the progression analysis of a specific project. It contains the management of different factors such as development of project cost, schedule etc. The results of these integration processes enhance the progress and overall outcomes of projects. It was identified that the achievement of earned value denotes the quantification process of any particular work done. Different types of software's are present which are utilized for the EVM process. The outcomes of these integrated software use become very beneficial for the development of successful project outcomes. In this particular study, the impact of using integrated project control software's is analyzed in the EVM process of projects. This research report includes a literature review which reviewed secondary literatures on EMV and integrated software suites. In addition, the future direction of this research is also discussed in this research.

LITERATURE REVIEW

Earn Value Management or EVM

According to Proaño-Narváez et al. 2022, EVM or Earn Value Management is a project management methodology which manages the progress of a project using different types of factors such as scope, cost, time, and schedule control etc. Over the past few years, the EVM process has gained the interest of different industrial sectors.

In addition, the research paper of Mayo-Alvarez et al. 2022, has mentioned that project baseline is created during the planning and scheduling of any particular project. The status of a project is examined by the formation of its performance analysis in comparison to the formed baseline of a project. The EVM process was developed as the method for this particular monitoring system. It was identified that the detection of work (scope) completed at a specified cost margin is a very important aspect of project management. However, when this process is combined with baseline factors of a project such as scope, schedule and cost, it describes the techniques of Earn Value Management or EVM. This research paper has also stated that the EVM can appropriately detect and calculate the costs of projects' overruns and savings. However, it was identified that this process does not only connect to the development of only critical tasks, instead it includes all project tasks.

According to Aramali et al. 2022, Earned Value Management is the project management technique that involves setting up a wide array of elements to maximize the chances of achieving the success of a project. This special procedure is used in several industries, including energy, aerospace, construction, defense, and manufacturing. In this research, the authors comprehensively reviewed several literature materials to learn about the working procedures of different EVMS and courses. The literature review gave an

understanding that the increased usage of resources can be associated with an enhancement to the EVM norms and standards.

The EVM process, according to Barrientos-Orellana et al. 2022, is one that can control and measure the progress of a particular project. This technology has now become an extremely promising procedure in a variety of industrial fields. This approach determines the status of a project against an intended timetable. Besides, this approach is popular mainly because of its basic structural structure. The implementation of such a method proved to help develop project duration analysis, according to the results of this research paper.

Integrated Project Control Software Suites in EVM

As mentioned by B.F.da Costa et al. 2022, worldwide, EVM and EVA or Earned Value Analysis is used in the constructions industry. From this study, the following findings were revealed several reasons made the business form of EVM to develop. The construction and development of building sector projects has always been in high demand or the growth of the economy for the country for many years now.

In addition, this particular industrial sector contains large projects which require the use of Earned Value analysis using integrated tools. It was identified that the use of these analytical tools helps in the early detection of issues in project planning and operations. Over the past few years the requirements of integration tools in project management become very important to properly increase the overall outcomes of projects. This integration procedure was created to increase the formation of corrective actions for achieving successful outcomes. The findings of this particular study have shown that the integration of software's in EVM has the ability to forecast for optimistic, realistic, and pessimistic scenarios.

The research paper of Khatri et al. 2022, has mentioned that the requirement of project management is getting more attention because of the presence of its structural framework. It was identified that the structure of a project holds both the vertical and horizontal workflow. The concept of EVM describes the understanding regarding different types of factors such as cost, schedule etc and their relation to the success of a project. In this particular study, the author has utilized the Primavera software for the EVA analysis of a specific project. The findings of this particular research work have shown that the increase of a projects' success has the ability to increase the overall outcomes of a project.

Method

This particular section of this research report includes the methods that are used to find out the effectiveness of software integrated EVM practices.

RESEARCH METHOD

The use of a mono research method was implemented in this particular research report. It was identified that the mono research method denotes the use of only one type of data. As this study holds the use of only secondary data, the implementation of mono research methods become very important.

Data Collection Method

In this study, secondary qualitative data was collected from a wide variety of secondary data sources. Different types of data such as previously completed literature, journals, articles, books were used to collect the data for this research. To collect these data, authentic online literature databases, online websites and also newspaper article websites were utilized.

Data Analysis Method

The data analysis procedure used in this particular research holds the formation of a qualitative data analysis process. The secondary data that were gathered in this study are analyzed using a critical analysis method. This data analysis procedure was used in this research to find out the understanding regarding the effectiveness and efficiency of software integrated EVM techniques.

RESULT
Earned value management systems (EVMS)
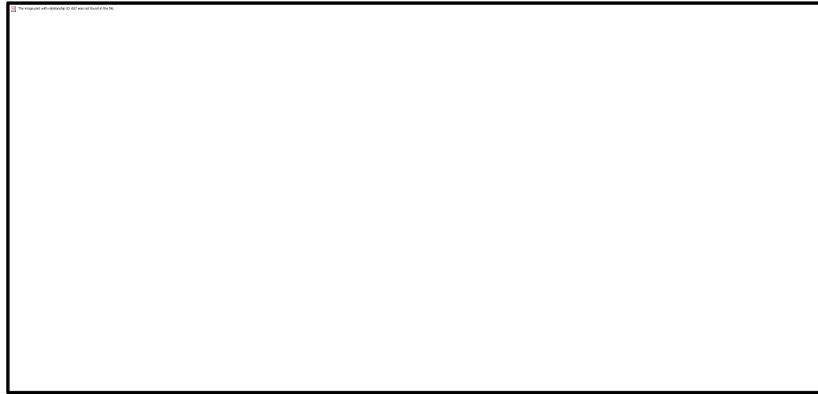
Figure 1: Earn Value Management

(Source: https://www.6sigma.us/project-management/earned-value-management-evm/)
It was found that the techniques of EVM includes the use of EVA or Earn Value Analysis procedure. EVA denotes the procedure which provides guidance to a project manager for calculating the operations performed in a particular project (Vanhouckeet al. 2022). It compares these project operations with the cost and schedule of projects. The term "earned value" describes the procedure in which analysis of allocated budget and actual costs are performed properly.

Integrated-EVM-procedure

Figure 2: Effective integrated EVM system
(Source: Self-created in MS Word)

The formation of an integrated EVM system becomes a very important factor which is used in the alignment of n operational and strategic levels of a project. This particular procedure helps to provide an extensive information to a project performance using its analytical aspects. In previously completed research papers, effectiveness of implementing earned value analysis (EVA) are examined (Vanhouckeet al. 2022). The findings of these research papers have shown that EVA systems have the ability to give a guideline for understanding the effects of a particular project and its environmental properties. It was found that an integrated system of EVM should include the use of different components. These components are Completion percentage, Planned value (PV), Earned value (EV) and Actual cost (AC).
In an EVM system the completion percentage helps in the understanding of each task's completion. With the help of this integration aspect, the modification of any particular project tasks can be done properly. On the other hand, planned value helps in the understanding of project commencement. It is directly related to the schedule planning of a project. Actual costs are also required to regularly examine the project management system and financial discipline. In addition, the earned value of an integrated EVM helps in the formation of actual percentage of task completion.

EVMS tools and their impact of projects' effectiveness
It was found from the collected data that the development of integrated software's or PM tools have the ability to influence the overall outcomes of a particular project. The requirements of these tools in the

management of EVM have increased significantly over the past few years (Ngoet al. 2022). The implementation of these tools become very important for large scale projects. It was identified that the use of integrated software's has the ability to improve the forecasting of costs, budget, and project completion schedule more precisely. The utilization of these tools also helps in the development of accurate information. Pre-existing articles have shown that by using these integrated tools in EVM, the analysis of data gathered from different databases becomes more suitable.

DISCUSSION

The use of an integrated EVM process became very important in the project management of different industrial sectors all around the world. For effective project delivery, the use of integrated project management software's suites has become very important. The results section of this study discussed a vast variety of impacts of the integrated management tools on the EVM procedure (Stone, 2023). Findings of previously completed research papers have shown similar outcomes. Over the past few years, the transition of conventional business practices happened towards sustainability.

It was identified that the improvement of effectiveness of the EVM practices can be done properly with the help of integrated software uses. In addition, it also helps in the maintenance of project sustainability. The use of machine learning software's and models such as ANN, KNN, and regression helps in the analysis of large financial information (Reiffand Schlegel, 2022). The findings of this research paper have shown that the formation of EVM helps in the detection of issues early. The predictive analytical abilities of the machine learning models become very important for completing these tasks of the EVM procedure. In addition, they can provide valuable opportunities for the project managers to create a system in which they can improve the project results.

Future Directions

The use of artificial intelligence tools in the development of EVM of different industries have become a major research area with potential opportunities. According to some previously completed research papers, the use of AI in PMO has become very beneficial for projects' success (El Khatibet al. 2022). However, there are less amount of research works are present who examine the use and impact of AI in the field of earned value management. Over the past few years, the growth of AI in the sector of industrial project management has become a research area with positive opportunities. Because of these reasons, this research field is selected as the future direction of this study.

CONCLUSION

Throughout this entire research report, the analysis regarding EVM and use of integrated software suites are described properly. In addition, this research aims to investigate the impact of integrated software for the improvement of EVM methods' effectiveness. In the initial section of this study, a literature review was completed which described the concepts regarding EVM and tools for EVM systems. The findings of the secondary data analysis have shown that the use of integrated EVM tools have the ability to effectively increase the earned value percentage of a particular project. Different types of tools such as project management office, Machine learning tools and Primavera software's become very important for the development of EVA. In addition, the future direction of this research is also discussed in this particular research report.

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